Remarks

Claims 1, 6-8, 14, 22, 23 and 25-30 have been amended as shown above. Antecedent basis for the amendments to claims 1, 8, 14 and 22 can be found in the Written Description at, e.g., page 4, lines 6-7 and 14-16, page 7, lines 3-4 and 21-23, page 11, lines 8-11, page 14, lines 26-27 and page 16, lines 1-6. Claims 1-32 will be pending after entry of this amendment.

Informality Objections

The disclosure was objected to on grounds that an appropriate cross-reference to related applications was missing. Reconsideration is requested. Page 1, lines 6-8 of the application already contains the requested cross-reference. The cited '380 parent application is properly identified and still pending in the USPTO. Correction of this citation is believed to be unnecessary.

Claim 23 was objected to on grounds that the word "electronic" should be inserted before "component". This amendment has been made as requested.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1, 6 and 25-30 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as their invention, on grounds that:

"- Claim 1, line 4, the claim is vague and indefinite because it is unclear if the "thus applied liquid" refers to the continuous coating or the newly-applied drops.

"- Claim 6, line 3; the claim is vague and indefinite because it is unclear if the "coating" refers to the continuous coating of the transfer surface or the coating on the substrate.

"- Claim 25, line 2; the claim is vague and indefinite because it is unclear if the "coating" refers to the continuous coating of the transfer surface or the coating on the substrate.

"- Claims 26-30, "caliper" lacks antecedent basis." (see the Office Action at page 3).

These amendments have been made as requested. Applicants accordingly request withdrawal of the rejection of claims 1, 6 and 25-30 under 35 USC §112, second paragraph.

Rejection of Claims 1, 2, 15-17 and 20 Under 35 U.S.C. §102(b)

Claims 1, 2, 15-17 and 20 were rejected under 35 U.S.C. §102(b) as being anticipated by Sedlacsik, Jr. (U.S. Patent No. 3,001,890), on grounds that:

> *"An electrostatic liquid coating method is taught for coating substrates, including insulating substrates such as wood (inherently porous and "biologically derived" per claims 17 & 20), earthenware (e.g. ceramic), etc (col. 4, 24-29). In the method charged liquid droplets from end 44 of spray gun S are sprayed onto rotating ("circulates" per claim 2) distributing disc 20 which in turn transfers/ projects coating material onto substrate object O (col. 2, 52-58; col. 3, 6-66). The disc is made of an electrically conductive material. After the initial application of the coating liquid to the disc, the disc while rotating would necessarily be continuously coated, and newly applied spray droplets would encounter the surface of the rotating disc 20 in an already wetted condition, as required by claim 1. The coating would be continuous to provide a continuous projection of liquid coating material onto the object to form the uniform coating requirement of col. 1, 29-32. The reference therefore meets each and every limitation of the claim as currently worded."* (see the Office Action at pages 3-4).

Reconsideration is requested. Sedlacsik, Jr.'s spinning disc 2 reionizes the coating material, breaks it up into fine particles and projects the reionized fine particles onto object **O** (see e.g., col. 1, lines 33-39 and **Fig. 2**, reproduced below):

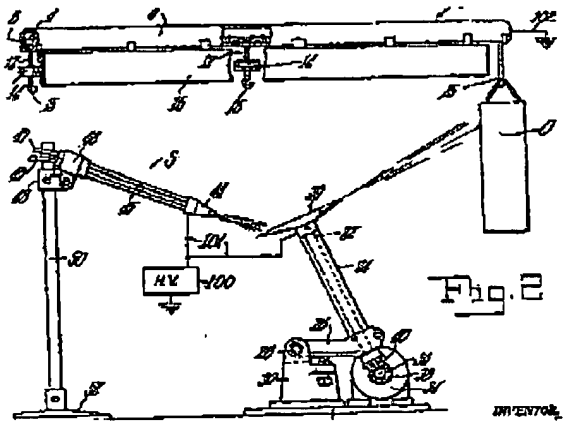


Fig. 2

Sedlacsik, Jr. does not disclose a device that involves contacting a transfer surface against a substrate to transfer a portion of a continuous coating from the transfer surface to the substrate to form a wet coating. Applicants accordingly request withdrawal of the rejection of claims 1, 2, 15-17 and 20 under 35 U.S.C. §102(b) over Sedlacsik, Jr.

Rejection of Claims 1-7, 15-23 and 31 Under 35 U.S.C. §103

Claims 1-7, 15-23 and 31 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. (U.S. Patent No. 6,063,450) in view of Sedlacsik, Jr. on grounds, *inter alia*, that:

> *"Bernert teaches methods of applying liquid coatings onto continuous substrates, e.g. web of paper or cardboard (which are porous and "biologically derived" since they are formed from natural biological materials), or textile (porous and insulating) per claims 15, 17, 20, one method being by indirect transfer means (this discussion herein refers only to that embodiment). Textile webs are inclusive of woven and non-woven webs of specific materials per claims 18 & 21. The indirect method comprises application of the liquid medium by one or more electrostatic spray nozzles onto a carrier face, e.g. counter-roll, where the coating is transferred to the web as it passes through a roll gap (gap between counter roller and second/ backing roller) per claims 2, 6 (col. 1, 14-31), which necessarily enhances coating uniformity by causing leveling per claim 7. However, transfer means can also be "another revolving support or*

carrier face", suggesting or encompassing a drum and a belt, per claims 3, 5. As evident, the substrate is not precharged, per claim 16. The conductivity of the transfer surface is not discussed.

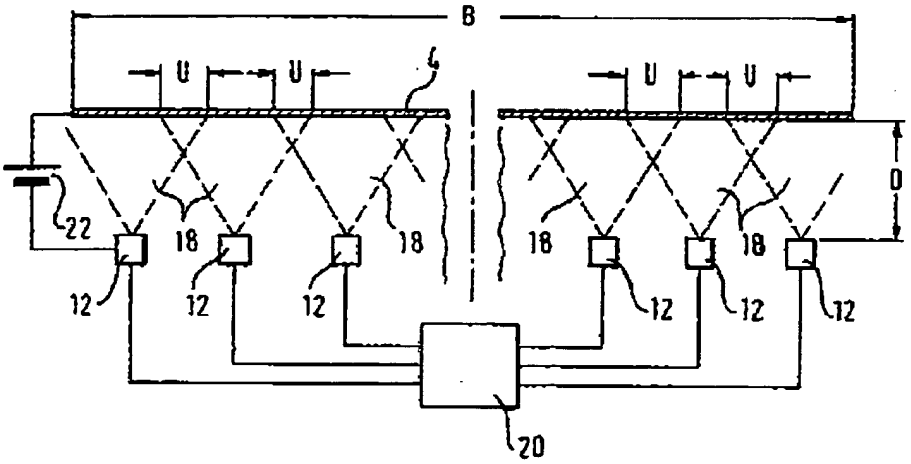
"Sedlacsik is cited for the same reasons previously discussed, which are incorporated herein. In the reference, a conductive transfer disk is taught (col. 2, 56-57), suggesting the use of conductive transfer means in other processes such as the transfer roll process of Bernert. The metallic transfer surface promotes charge grounding/ neutralization." (see the Office Action at pages 4-5).

and that:

"It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Bernert et al by utilizing a conductive transfer means as taught by Sedlacsik Jr to provide conductive surface for modifying electrostatic charge onto which coating material is applied and subsequently applied to a substrate." (see the Office Action at page 6).

Reconsideration is requested. As acknowledged in the Office Action, Bernert et al. do not discuss transfer surface conductivity. Bernert et al. show in **Fig. 2** an electrostatic spray embodiment that sprays a coating from nozzles 12 onto a substrate 4:

FIG. 2



This appears to be the only electrostatic embodiment actually depicted in Bernert et al. Bernert et al. do not show a method involving electrostatically spraying drops of a liquid onto a liquid-wetted target region of a conductive transfer surface, wherein the target region is at a lower voltage than the drops and has a continuous coating of the liquid before newly-applied drops land, and contacting the transfer surface against a substrate to transfer a portion of the thus-applied liquid continuous coating from the transfer surface to the substrate to form a wet coating. Applicants' method may facilitate wetting, drop spreading, and formation of a uniform continuous film on a target substrate by combining electrostatic spraying, a lower voltage or grounded conductive transfer surface and contact of the transfer surface with the substrate (see e.g., applicants' Written Description at page 2, lines 2-30, page 3, lines 3-28, page 7, lines 2-24 and Example 1 at pages 25-26). Bernert et al. do not show such a method.

If Bernert et al. and Sedlacsik, Jr. were combined as proposed in the Office Action, the combination might at best result in electrostatically spraying a liquid from Bernert et al.'s nozzles **12** onto Sedlacsik, Jr.'s spinning disc **2** where the liquid would be reionized, broken up into fine particles and projected onto a target substrate. The proposed combination of Bernert et al. and Sedlacsik, Jr. would not provide applicants' claim 1 method.

The Office Action also asserts:

> *"As to claim 22, the depth of penetration of coating into a porous substrate would have been dependant upon (1) the porosity of the substrate, and (2) the pressure on the applied coating at the nip, as would have been obvious to the skilled artisan."* (see the Office Action at page 5)

Reconsideration is requested. Neither Bernert et al. nor Sedlacsik, Jr. show a method in which one or more nip rolls force a porous substrate against a transfer surface and the substrate is coated without substantial penetration of the coating through the substrate. Applicants discuss the difficulties that ordinarily arise when electrostatically coating porous substrates (see e.g., page 3, line 29 through page 4, line 2, page 11, lines 8-15, Comparison Example 4 at page 35 and Example 8 at pages 35-36). The proposed combination of Bernert et al. and Sedlacsik, Jr. would not provide applicants' claim 22 method.

The Office Action also asserts:

"As to claim 23, the end-use of the substrate cited by Bernert is not limited, and would have included an electronic film, any component (textiles, wood, etc are "components"), or a precursor thereof because of the expectation of successful coating." (see the Office Action at page 5)

Reconsideration is requested. Neither Bernert et al. nor Sedlacsik, Jr. say anything regarding electronic films or electronic components. Electronic films often are insulative or include insulative regions. Electrostatic coating of insulative films may cause charge buildup and may require pre-charging or neutralization (see e.g., page 3, lines 11-28). Applicants' claim 23 method is particularly well suited for electrostatically applying liquids to electronic films and electronic components, and is not shown by Bernert et al. or Sedlacsik, Jr. The proposed combination of Bernert et al. and Sedlacsik, Jr. would not provide applicants' claim 23 method.

The Office Action also asserts:

"While a second transfer surface is not taught per claim 19, it would have been obvious to the skilled artisan that providing plural transfer means to apply coatings would have been expected to provide equivalent results, absent a clear and convincing showing to the contrary." (see the Office Action at page 5)

Reconsideration is requested. Applicants' claim 19 method can facilitate the application of thin continuous coatings on difficult-to-coat substrates. When the recited conductive transfer surface contacts the second transfer surface and when the second transfer surface contacts the substrate, caliper non-uniformity in the transferred coating may be reduced (see e.g., page 10, lines 21-32). The proposed combination of Bernert et al. and Sedlacsik, Jr. would not provide applicants' claim 19 method.

Applicants accordingly request withdrawal of the rejection of claims 1-7, 15-23 and 31 under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. in view of Sedlacsik, Jr.

Rejection of Claims 8-14 and 32 Under 35 U.S.C. §103

Claims 8-14 and 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. in view of Sedlacsik, Jr. and further in view of Hall (GB 1 278 099), on grounds that:

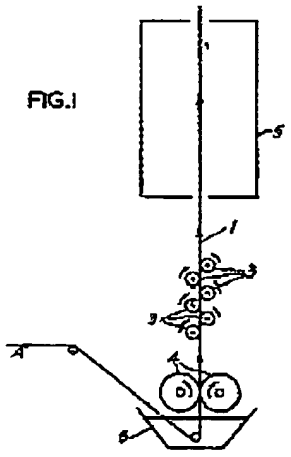
"Bernert and Sedlacsik Jr are cited for the same reasons previously discussed, which are incorporated herein. Pick and place devices are not taught.

"Hall teaches a method of liquid coating stripes to a film/ web substrate, in which the coating is contacted with at least two staggered smoothing rollers which pick up a portion of the coating and re-apply the portion to cause widening out, smoothing, and thinning of the coating, along with a decrease in longitudinal striations (p. 1, 92 to p.2, 17). Col. 1 41-46 teaches the use of at least 2, and even 5 or more rollers, hence the number of rollers of claims 8 and 10 are encompassed by Hall. The diameters of the rollers, means of causing rolling, etc of claims 11-13 would have been obvious variations within the purview of one skilled in the art to provide specific roller speeds and contacting surfaces required for any end-use application.

"It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Bernert et al in view of Sedlacsik Jr by incorporating the pick and place rollers of Hall to provide transferred coatings with improved widening, smoothness, and surface texture." (see the Office Action at page 6).

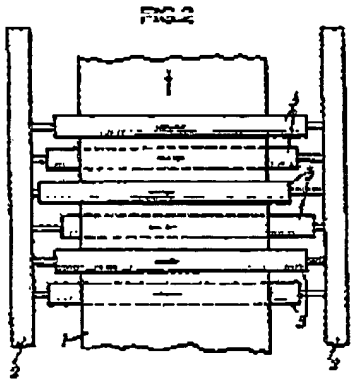
Reconsideration is requested. Bernert et al. and Sedlacsik, Jr. are discussed above. Hall shows a roll coater 4 that applies a coating liquid on both sides of a film 1. Each wet coating is contacted by three counter-rotating smoothing rollers 3:

FIG.1



Hall's rollers 3 are all the same size (see e.g., page 2, lines 97-98), are mounted together in a support structure 2 (see e.g., **Fig. 2** and page 2, lines 89-93), are geared together using straight-cut gears (see e.g., page 2, line 127 through page 3, line 2) and are said to spin at the same speed (see e.g., page 3, lines 7-8). Such an arrangement would by itself merely repropagate, not reduce defects (see e.g., applicants' Written Description at page 15, line 28 through page 16, line 1).

Hall says however that at least one of his rollers 3 "is continuously moved to and fro in relation to the film" (see e.g., page 1, lines 64-65), that the or each roller may be reciprocated in the roller's axial direction transverse to the direction of film travel (see e.g., page 1, lines 80-83) or caused to vibrate in other than the axial direction (see e.g., page 1, lines 83-86, Fig. 3 and Fig. 4). Hall also says that if more than one roller is moved then the motion preferably is a reciprocal movement transverse to film 1's direction travel to impart a sideways thrust to the coating liquid, and that the reciprocal roller movements should be out of phase with one another (see e.g., page 1, lines 80-89 and page 2, lines 38-55). Hall says this may be accomplished using a vertical camshaft (see e.g., page 2, lines 117-127) whose lobes bear on the ends of the shafts carrying the rollers 3:



Hall does not show vibrating two or more rollers in the direction of substrate motion and out of phase with one another. Hall mounts his rollers in support structure 2, which would presumably cause such vibrations to be in phase rather than out of phase.

Hall seeks to thin the coating and smooth out transverse (cross-web) coating thickness variations (see e.g., page 1, line 92 through page 2, line 63). Hall does not discuss reduction

of lengthwise (direction of web motion) thickness variations. Put another way, Hall seeks improved cross-web uniformity, not improved down-web uniformity.

Hall does not say that his device should employ 5 or more rollers. Hall says that:

"It seems to be generally understood that one smoothing roller per side is insufficient, and in one difficult case it has even been proposed that a minimum of five rollers per side should be employed. In general, however, two rollers per side are employed." (see page 1, lines 41-46).

This however is a discussion of prior devices (which apparently had non-reciprocated equal size rollers), not a recommendation regarding the number of rollers in Hall's device. Also, Hall does not show a device having different diameter rolls as recited in claim 11, devices having undriven rolls as recited in claims 12 and 13, or a device with a rotating endless belt as recited in claim 14.

Applicants accordingly request withdrawal of the rejection of claims 8-14 and 32 under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. in view of Sedlacsik, Jr. and further in view of Hall.

Rejection of Claims 24-30 Under 35 U.S.C. §103

Claims 24-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. in view of Sedlacsik, Jr. and further in view of Leonard et al. (U.S. Patent No. 5,409,732), on grounds that:

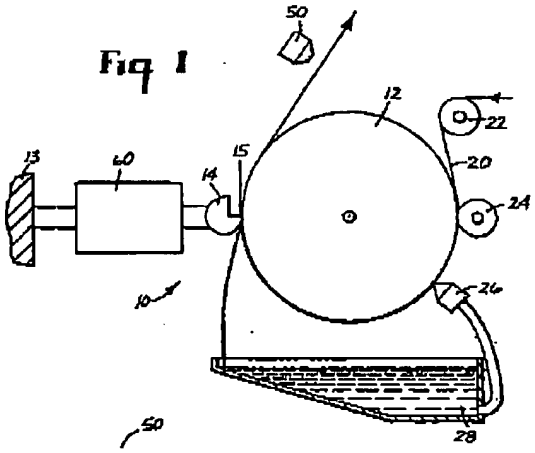
"Bernert and Sedlacsik, Jr are cited for the same reasons previously discussed, which are incorporated herein. Achieving a caliper is not taught.

"Leonard et al teaches regulating thickness of a coating applied to a web using a metering beam 14 adjacent roller 12 forming gap 15 between which a coated web passes to remove excess coating. The width and shape of the gap formed produces a coating of uniform and regulated thickness (col. 1, 30-33; col. 3, 16-38; col. 5, 17-44; fig. 1). Coated substrates are necessarily dried, cured and/or hardened to provide a coated substrate with utility. The "regulated thickness" would have been any desired thickness for a given end-use application, with the amount determined by routine experimentation or following industry criteria, per claims 26-30. It would have been

obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Bernert et al in view of Sedlacsik Jr by incorporating the teachings of Leonard regarding caliper of the coating to produce smooth coatings with consistently uniform thickness." (see the Office Action at page 6).

Reconsideration is requested. Bernert et al. and Sedlacsik, Jr. are discussed above. Leonard et al. apply excess coating using flow bar **26** and scrape it off using metering beam **14** (see e.g., col. 3, lines 34-38 and **Fig. 1**, reproduced below):

Fig 1



Leonard et al. move metering beam **14** using piezoelectric actuators **60** and **62** to compensate for run-out in roll **12** (see e.g., col. 4, lines 18-22 and **Fig. 3**, reproduced below):

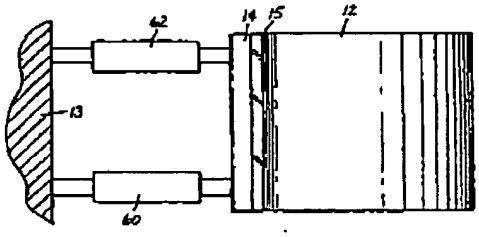


Fig 3

Leonard et al. do not spray drops of coating, and is not properly combinable with Bernert et al. or Sedlacsik, Jr. If Leonard et al. was nonetheless combined with Bernert et al. or Sedlacsik, Jr. as proposed in the Office Action, the resulting combination would employ flow bar **26** together with metering bar **14**, would not involve spraying drops of coating, and would not provide a method according to applicants' claims 24-30. Applicants accordingly request

withdrawal of the rejection of claims 24-30 under 35 U.S.C. §103(a) as being unpatentable over Bernert et al. in view of Sedlacsik, Jr. and further in view of Leonard et al.

Conclusion

Applicants have made an earnest effort to overcome the rejections. The 35 U.S.C. §112 rejections have been mooted by the amendments shown above. Sedlacsik, Jr.'s spinning disc device does not contact a transfer surface against a substrate to transfer a portion of a continuous coating from the transfer surface to the substrate to form a wet coating. Bernert et al. do not show a method involving electrostatically spraying drops of a liquid onto a liquid-wetted target region of a conductive transfer surface, wherein the target region is at a lower voltage than the drops and has a continuous coating of the liquid before newly-applied drops land, and contacting the transfer surface against a substrate to transfer a portion of the thus-applied liquid continuous coating from the transfer surface to the substrate to form a wet coating. Hall seeks improved cross-web uniformity, not improved down-web uniformity. Leonard et al. do not spray drops of coating, and is not properly combinable with Bernert et al. or Sedlacsik, Jr. Applicants accordingly request reconsideration and withdrawal of the rejections and passage of the application to the issue branch. The Examiner is encouraged to telephone the undersigned attorney at 612-331-7412 to discuss any remaining questions concerning this application or this amendment.

Respectfully submitted on behalf of
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